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# Sickness absence and full return to work after cancer: 2-year follow-up of register data for different cancer sites

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## Abstract

**Objective:** Cancer survival has improved in recent years, but data on return to work (RTW) after cancer are sparsely published. Therefore, this study analysed RTW after cancer.

**Methods:** Employees diagnosed with breast cancer, genital cancer, gastro-intestinal cancer, lung cancer, skin cancer, or blood malignancies were selected from an occupational health register. Sickness absence was followed for 2 years after diagnosis and full RTW at equal earnings as before sickness absence was assessed for each cancer site using Cox proportional hazards regression analysis stratifying for age and gender.

**Results:** 3701 (73%) of 5074 employees with cancer had full RTW after a median duration of 290 days. Employees with lung cancer had the longest duration of sickness absence and only 45% of them had full RTW 2 years after diagnosis compared with 88% of employees with genital cancer and 87% of employees with skin cancer. Age was associated with the time to full RTW among employees with genital cancer: women aged  $\geq 35$  years had a longer time to full RTW compared with women  $< 35$  years and men aged  $\geq 55$  years had a longer time to full RTW compared with men  $< 35$  years. Gender was associated with the time to full RTW among survivors of blood malignancies with women having a longer time to full RTW than men.

**Conclusions:** Most employees had full RTW within 2 years after the diagnosis of cancer and the time to RTW was largely independent of age and gender.

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## Introduction

Improvements in cancer care, with better prevention and screening programmes and multidisciplinary treatment of cancer according to evidence-based clinical guidelines, have increased cancer survival in Europe [1]. Cancer survival rates are highest in Finland, Sweden, Norway and Iceland and lowest in the Czech Republic, Poland and Slovenia [2]. The estimated proportions of cancer survivors vary between 21 and 47% in men and 38 and 59% in women [3]. Given these survival rates, returning to paid work after cancer is increasingly important, all the more because social involvement and income levels improve the quality of life of cancer survivors [4–6].

Recent studies have reported on employment rates of cancer survivors using national employment statistics [7–13]. Overall, cancer survivors were 1.4 times more likely to be unemployed than healthy controls [14]. Norwegian cancer survivors were more frequently unemployed than the cancer-free population, even when accommodations in

work or lower-wage jobs with reduced earnings were adjusted for [15]. Danish cancer patients had a small increased risk of unemployment during 20 years of follow-up, with 12% higher unemployment among women and 6% among men compared with age-matched referents [16]. The unemployment rate of Finnish cancer survivors 2 to 3 years after diagnosis was 9% higher than gender- and age-matched referents [17,18]. However, employment statistics do not provide insight in the course of return to work (RTW), which is the process of occupational rehabilitation after the diagnosis of cancer.

There has been a steady flow of research on occupational rehabilitation of cancer survivors in the eighties and nineties with RTW rates in either equal earnings or reduced earnings ranging from 30 to 93% 1–8 years after diagnosis [19]. RTW rates vary remarkably in the literature, despite comparable study populations. For example, 88% of Canadian breast cancer patients returned to work within 12 months after surgery [20]. In recent European studies, RTW rates 12 months after

breast cancer varied between 54 and 63% [21–23]. The different RTW rates may be explained by differences in the health-care systems and social insurances across countries [24]. While some countries emphasise sickness compensation policies with broad access to disability benefits, other countries have occupational rehabilitation policies and restricted access to disability benefits [25]. In most western European countries, sickness absence is fully compensated in the first year of absence. The Netherlands have generous sickness absence compensation policies in which sick-listed employees are fully compensated in the first year of sickness absence and receive 70% of their income in the second year of sickness absence, irrespective of the cause of sickness absence. Thus, not only work-related injuries are compensated, but also diseases unrelated to work. Spelten *et al.* reported that 36% of Dutch cancer survivors was absent from work for more than 18 months in 1999 corresponding to 64% RTW in equal or reduced earnings as before sickness absence [26].

Now that cancer survival has improved, topical information is needed about sickness absence and RTW after cancer. There is some recent information on RTW after breast cancer [20–23], but data on RTW with regard to other cancer sites are sparse. This study presents the course of sickness absence within 2 years after the diagnosis of cancer in Dutch employees and assesses the time to full RTW for different cancer sites stratified by age and gender.

## Patients and methods

### Patients

The sickness absence register of ArboNed Occupational Health Services (OHS) contains sickness absence data and medical diagnoses of 1 million Dutch wage earners working in different economic sectors representative for the Dutch workforce. Cases were selected from this sickness absence register if they met the following eligibility criteria:

- Sickness absence due to cancer.
- Aged 18–60 years.
- In permanent paid employment at the time of diagnosis.

In the Netherlands, sickness absence is medically certified by an occupational physician (OP) usually in the third or fourth week of sickness absence. For this study, we selected employees who were absent from work due to medically certified breast cancer, genital cancer, gastro-intestinal cancer, lung cancer, skin cancer, and blood malignancies (including lymphomas and leukaemias) diagnosed between 1 January 2004 and 31 December 2006. Approval

from a medical ethics board was not necessary as we analysed register data on group level and neither consulted medical files nor involved the cancer survivors themselves in the study. Employees give informed consent to the use of their sickness absence data for scientific research at the time their data are entered in the sickness absence register.

## Methods

Data on sickness absence were gathered from the OHS register in which the first day of sickness absence is registered as well as the diagnosis on the sickness absence certificate issued by the OP and the dates of RTW. In this study, full RTW, defined as returning to work at equal earnings as before sickness absence, was the event of interest, because RTW in reduced earnings or lower-wage jobs is not consistently recorded in the OHS register.

Kaplan–Meier curves were computed to illustrate the course of sickness absence according to cancer site in the 2 years after diagnosis. The course of sickness absence was compared with a reference curve of 271 834 sickness absences due to non-malignant causes exceeding 2 months in duration. The Kaplan–Meier method recalculated the proportion of sickness absence at every event of full RTW. In the Netherlands, employees are granted disability pension after 2 years of incapacity to work. Therefore, sickness absence episodes were cut off at 730 days.

The time to full RTW was assessed for each cancer site by Cox proportional hazards regression analysis in SPSS for Windows version 14, stratifying for age (<35 years, 35–44 years, 45–54 years, ≥55 years) and gender (men, women). Cox regressions yield hazard ratios (HR). A HR < 1.0 reflects a longer time to full RTW and a HR > 1.0 a shorter time to full RTW. Statistical significance was set at the 5% level and concluded for  $p < 0.05$ .

## Results

Between January 2004 and December 2006, we counted 5074 employees who were absent from work due to cancer; 1806 (36%) of them were men and 3268 (64%) women. The mean age of these employees was 47.7 (standard deviation 9.8) years at diagnosis. Sickness absence due to breast cancer was most common, followed by female genital cancer, gastro-intestinal cancer and lung cancer. 3701 employees (73%) had full RTW 2 years after the diagnosis of cancer and 637 (13%) were granted disability pension (Table 1). 433 (8%) employees resigned during sickness absence and 303 (6%) died within 2 years after diagnosis. The

**Table 1.** Patients (*n* = 5074) stratified according to cancer site

Cancer site	N	Men N	Women N	Mean age (SD) <sup>a</sup> at diagnosis	Median (95% CI) <sup>b</sup> duration of sickness absence in days	Full return to work N (%)	Disability N (%)	Resigned N (%)	Died N (%)
Breast	1579	12	1567	47.7 (8.0)	350 (337–363)	1201 (76)	217 (14)	134 (8)	27 (2)
Female genitals	855	—	855	43.9 (9.2)	105 (97–113)	751 (88)	55 (6)	35 (4)	14 (2)
Gastro-intestinal	725	503	222	52.7 (7.5)	385 (354–416)	438 (60)	126 (17)	73 (10)	88 (12)
Lung	448	286	162	53.1 (7.1)	490 (404–576)	204 (45)	65 (15)	88 (20)	91 (20)
Male genitals	406	406	—	47.3 (13.1)	163 (137–189)	355 (88)	25 (6)	18 (4)	8 (2)
Skin	301	181	120	46.4 (9.8)	84 (71–97)	262 (87)	12 (4)	14 (5)	13 (4)
Blood	297	192	105	42.3 (12.5)	456 (387–525)	184 (62)	71 (24)	26 (9)	16 (5)
Other	463	226	237	46.2 (10.8)	320 (280–360)	306 (66)	66 (14)	45 (10)	46 (10)
Total	5074	1806	3268	47.7 (9.8)	290 (279–301)	3701 (73)	637 (13)	433 (8)	303 (6)

<sup>a</sup>SD = standard deviation.<sup>b</sup>CI = confidence interval.

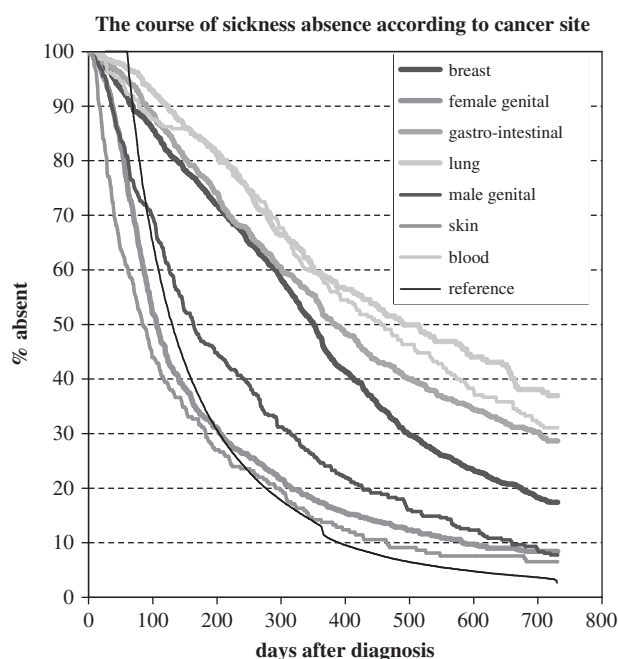
data of these employees were right censored at the moment they resigned or died.

The full RTW rates of employees diagnosed with genital cancer or skin cancer differed from those with cancer at other body sites. Thirty-three percent of women with genital cancer were longer than 6 months absent from work and 17% longer than 12 months, compared with 46 and 25% of men with genital cancer. Twenty-nine percent of employees with skin cancer were longer than 6 months absent from work and 14% longer than 12 months. Figure 1 shows that the course of sickness absence of employees with genital cancer or skin cancer was comparable to the course of sickness absence of employees with non-malignant chronic disorders (reference).

Sickness absence percentages were higher than the reference curve for employees with breast cancer, gastro-intestinal cancer, lung cancer, and blood malignancies. 74% of women with breast cancer were absent longer than 6 months and 46% longer than 12 months. 52% of patients with gastro-intestinal cancer, 59% of patients with lung cancer, and 58% of patients with blood malignancies were longer than 12 months absent from work (Figure 1).

The Cox regression models showed that the time to full RTW was longer in women with genital cancer aged 35–44 years (Hazard Rate [HR] = 0.8 and 95% confidence interval [CI] 0.6–0.9; *p* = 0.008), 45–54 years (HR = 0.6 and 95% CI 0.5–0.8; *p* < 0.001), and ≥ 55 years (HR = 0.4 and 95% CI 0.3–0.6; *p* < 0.001) compared with women with genital cancer aged < 35 years (Table 2). The time to full RTW in men with genital cancer aged ≥ 55 years was longer (HR = 0.8 and 95% CI 0.6–1.0; *p* = 0.037) compared with men aged < 35 years.

Full RTW was independent of gender for most cancer sites, except for blood malignancies. Female survivors of blood malignancies had a longer time to full RTW (HR = 0.6 and 95% CI 0.5–0.9; *p* = 0.005) than male survivors of blood malignancies.



**Figure 1.** This figure shows the course of sickness absence following the diagnosis of breast cancer (1579 patients), cancer of the female (855 patients) and male (406 patients) genitals, gastro-intestinal cancer (725 patients), lung cancer (448 patients), skin cancer (301 patients), and blood malignancies (297 patients); the figure also shows a reference curve of 271 834 sickness absences due to non-malignant chronic disorders

## Discussion

A total of 73% of cancer survivors had full RTW that is at equal earnings as before sickness absence; 13% were granted disability pension, 8% resigned their job, and 6% died within 2 years after diagnosis. Full RTW rates of employees diagnosed with genital cancer or skin cancer were comparable to those of employees who were absent from work due to non-malignant chronic disorders. The rates of full RTW were considerably lower in patients diagnosed with breast cancer, gastro-intestinal cancer, lung cancer, and blood malignancies and

**Table 2.** Cox regression analysis of full RTW according age and gender

	Breast cancer	Genital cancer		Gastro-intestinal cancer	Lung cancer	Skin cancer	Blood malignancies
		Women	Men				
Age							
< 35 years							
35–44 years	1.0 (0.8–1.3)	0.8 (0.6–0.9)**	0.9 (0.6–1.2)	0.8 (0.4–1.3)	1 <sup>a</sup>	0.9 (0.6–1.3)	1.0 (0.7–1.5)
45–54 years	1.0 (0.8–1.3)	0.6 (0.5–0.8)**	0.8 (0.6–1.2)	0.7 (0.4–1.1)	0.9 (0.6–1.4)	0.9 (0.6–1.4)	0.8 (0.5–1.2)
≥ 55 years	1.3 (1.0–1.6)	0.4 (0.3–0.6)**	0.8 (0.6–1.0)*	0.8 (0.5–1.3)	1.0 (0.7–1.6)	0.8 (0.6–1.3)	1.0 (0.7–1.5)
Gender							
Men	—	—	—				
Women	—	—	—	1.0 (0.8 – 1.2)	0.8 (0.6–1.1)	0.8 (0.7–1.1)	0.6 (0.5–0.9)**

The table shows Hazard Rates (HR) with their 95% confidence intervals between brackets \* $p < 0.05$  and \*\* $p < 0.01$ . A HR < 1.0 reflects longer time to full RTW and a HR > 1.0 shorter time until full RTW.

<sup>a</sup>Aged 35–44 years were added to the reference group because the group aged < 35 years was too small.

were in line with cancer survival data in European adults [27]. Employees with lung cancer were absent from work for the longest period of time (median 490 days) and had the worst RTW prognosis. Women aged ≥ 35 years and men aged ≥ 55 years with genital cancer had a longer time to full RTW compared with survivors of genital cancer aged < 35 years. Women with blood malignancies had a longer time to full RTW than men with blood malignancies.

### Full RTW according to cancer site

Our results show that the duration and course of sickness absence after cancer depends on the cancer site. Survivors of genital cancer or skin cancer have the best RTW prognosis with 88% of employees having full RTW 2 years after the diagnosis of genital cancer and 87% 2 years after skin cancer. Testicular cancer and skin cancer are known to have high survival rates [28,29]. Our results add that the course of sickness absence in patients with cancer at these sites is comparable to that of patients with non-malignant chronic (i.e. lasting > 2 months) disorders. This may be explained by the type of treatment. Skin cancer, for instance, can often be surgically removed and genital cancers are treated with surgery, radiation therapy, and, if appropriate, hormonal therapy. Furthermore, cervical malignancies are detected early in the Netherlands, because all women with an age between 30 and 60 years are called for cervical tissue screening every 5 years. Therefore, the treatment of female genital cancer can also be confined to surgery and radiation therapy in most cases.

Full RTW rates of patients diagnosed with breast cancer, gastro-intestinal cancer, lung cancer, and blood malignancies varied between 45 and 76% in our study population, which is in line with cancer survival rates in Europe [3,27] and the employment statistics of Finnish cancer survivors that ranged from 40 to 74% [17,18]. Patients with these cancers are often treated intensively with adjuvant chemotherapy. Chemotherapy usually lasts several

months and is known to postpone RTW [30–32]. Furthermore, chemotherapy has been associated with long-term effects on higher cognitive functioning [33,34], which may delay full RTW in mentally demanding jobs. Cognitive impairment due to the neurotoxicity of chemotherapeutics is estimated to occur in 17–75% of patients and up to 35% may suffer from long-term effects [35]. However, methodological limitations preclude asserting that chemotherapy is the cause of cognitive impairment [36]. Other factors than chemotherapy may also cause cognitive dysfunctioning in cancer survivors, for example fatigue [37], distress [38], and depression [26,39]. Nieuwenhuijsen *et al.* found impaired neuropsychological functioning in one-third of the cancer survivors, which was related to a lower vocational functioning [40]. However, the relationship was not statistically significant and the authors concluded that more research is needed to test the relevance of neuropsychological impairments for vocational functioning.

### Full RTW according to age and gender

Earlier studies have reported opposing results on the association between the age of cancer survivors and employment statistics. Some studies found that older cancer survivors were less likely to be employed than their referents [7,8,11,26], while Maunsell *et al.* reported that 17% of Canadian survivors of breast cancer aged 50–59 years were employed at the end of follow-up compared with 10% of their age-matched referents [41]. Taskila *et al.* reported that age did not have modifying effects on employment rates of Finnish cancer survivors [17]. A recent meta-analysis confirmed that the age of cancer survivors was not a prognostic risk factor for future unemployment [14]. We found that age was associated with full RTW among survivors of genital cancer only, with a longer time to full RTW in older men and women compared with those aged < 35 years. Age was not associated with the time to full RTW of employees with cancer at other body sites.

With regard to gender, Short *et al.* found that female cancer survivors had higher odds of unemployment 2–4 years after diagnosis than male cancer survivors [11]. Our results showed that gender was only associated with the time to full RTW after the diagnosis of blood malignancies with a longer time to full RTW in women compared with men.

### Strengths and limitations of the study

The strength of our study is that it covered a large population of 1 million Dutch employees, representative for the Dutch workforce. Another strength is the use of medical diagnoses on the sick-leave certificates. The validity of these diagnoses was not tested, but it is unlikely that OPs write cancer as diagnosis on the sick-leave certificate of workers who do not have cancer. However, sick-leave certificates contain only one diagnostic code and information on co-morbidity was lacking. More detailed information on co-morbidity is probably interesting, because co-morbidity may hinder RTW [42]. We also had no information about the sequelae of cancer such as fatigue [37], distress [38], and depressive symptoms [26,39], which are often found in cancer survivors [26].

Another limitation of our study is that we had no access to the medical files of the patients. Therefore, information on the extent of cancer (local, regional, or metastatic) and the type of treatment was not available. Occupational rehabilitation and employment rates have been found to be associated with cancer type and treatment modalities [30–32,43,44]. Furthermore, information about interventions to facilitate RTW, such as rehabilitation programmes, work accommodations (e.g. modified work tasks, reduction of work hours), or placement in another job, was not available in the register data, while such work accommodations facilitate RTW [19,31].

Finally, we studied full RTW in equal earnings as before sickness absence. The fact that we regarded full RTW as the event of interest may have overestimated the duration of absence from work. On the other hand, it may have underestimated the number of patients who returned to work, because we assume that more patients will resume work part-time or in lower-wage jobs.

To conclude, we found that the majority of cancer survivors had full RTW within 2 years after diagnosis. Apart from employees with genital cancer and employees with blood malignancies RTW did not depend on age and gender.

### Practical implications and recommendations

Our results show that full RTW occurs within 3 months in many employees with skin cancer or genital cancer and in some employees with cancer

at other sites, despite the generous sickness compensation policies in the Netherlands. This means that occupational rehabilitation should be part of the treatment of cancer in an early stage. It has been reported that RTW is more successful when improvement of skills or learning new skills necessary for the employee's RTW are addressed as part of the treatment [11]. Physicians can advise employees with cancer to remain involved in their work during treatment and support employees when they resume their work [45]. Occupational health professionals may advise employers to stay in contact with the employee to express concern and compassion. Employers can facilitate RTW of cancer survivors by creating a supportive 'welcome back' work environment [19,29] and accommodating work and working conditions [45,46].

Finally, we recommend publishing data on RTW after cancer from other countries. It would be interesting to investigate these RTW data in the context of different health-care systems and different social insurances.

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